

Abstract ID : 939

Title : Evaluation of factors influencing recent fluctuations in numbers of southern resident killer whales (*Orcinus orca* [L., 1758]) off Washington State (USA) and British Columbia (Canada)

Category : Conservation

Student : Not Applicable

Preferred Format : Oral Presentation

Abstract : Southern resident (SR) killer whales (*Orcinus orca* [L.]) occur in the protected marine waters of Washington State (USA) and British Columbia (Canada) in the northeastern Pacific Ocean. Survey data indicate a general upward trend in the population since 1974. Several notable periods of fluctuation are imposed on the general trend, with the most recent a rather sharp decline in numbers beginning after 1996. Possible risk factors associated with the recent decline include changes in prey abundance, distribution, and availability, increasing rates of disturbance by vessel traffic, ongoing exposure to anthropogenic chemical contamination, natural fluctuations in habitat quality, and stochastic demographic processes. We report results of analyses of covariations of the SR population with risk factors for which data time series are available, with the intention of narrowing management effort to those factors most likely contributing to SR declines. We focus on time series for Chinook salmon (*Oncorhynchus tshawytscha* [Walbaum, 1792]), a primary prey for SRs, and for whalewatch boat numbers and sea surface temperature (SST). The absence of an adequate time series of data prevented inclusion of chemical contaminants in our analysis, but we do not exclude contaminants as an important risk factor. We utilized program MARK to estimate parameters of age and sex specific survivorship and to evaluate the importance of covarying risk factors. Survivorship parameters from MARK output were used to construct an individually-based population dynamics model for SRs, allowing evaluation of the role of stochastic demographic factors in SR population fluctuations. Models of covariation were evaluated using the Akaike Information Criterion (AIC). Models incorporating whalewatch fleet size were ranked highest by AIC in the covariate analysis. Models including salmon abundance were also ranked highly. Temporal trends in SR survivorship rate were weaker than expected, and stochastic demographic factors likely contributed to SR declines.